

NON-PUBLIC?: N
ACCESSION #: 9212100118
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Millstone Nuclear Power Station Unit 3 PAGE: 1 OF 4

DOCKET NUMBER: 05000423

TITLE: Reactor Trip Due To Loss of Non-Vital Power
EVENT DATE: 11/05/92 LER #: 92-027-00 REPORT DATE: 12/04/92

OTHER FACILITIES INVOLVED: DOCKET NO: 05000

OPERATING MODE: 1 POWER LEVEL: 016

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR
SECTION:

LICENSEE CONTACT FOR THIS LER:
NAME: Jeffrey S. Young, Engineer, TELEPHONE: (203) 447-1791
Ext. 6442

COMPONENT FAILURE DESCRIPTION:
CAUSE: SYSTEM: COMPONENT: MANUFACTURER:
REPORTABLE NPRDS:

SUPPLEMENTAL REPORT EXPECTED: No

ABSTRACT:

At 1630 on November 5, 1992, with the plant in Mode 1 at 16% power, an electrical fault protection signal in the zone between the generator and the switchyard resulted in a generator trip, turbine trip and reactor trip.

The cause was a spurious signal from one of two protective relays. Improper operation of either relay could not be repeated. A management review of these possible causes and actions to resolve them was conducted before startup was authorized. A Feed Water Isolation actuation occurred due to low Reactor Coolant System temperature. No other Engineered Safety Feature (ESF) signals were initiated or required and the event posed no significant hazard to the health and safety of the public.

END OF ABSTRACT

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I. Description of Event

On November 5, 1992 at 1630 with the plant in Mode 1 at 16% power (562 degrees Fahrenheit and 2260 psia) an electrical fault protection signal in the zone between the generator and the switchyard resulted in a generator trip, turbine trip and reactor trip.

At the time of the trip, operators verified that the Reactor Trip and Bypass Breakers were open, that all control rods were fully inserted, and that neutron flux was decreasing. A Feed Water Isolation actuation occurred due to low Average Reactor Coolant System temperature following the trip. This was an expected system response. No additional Engineered Safety Features were required or initiated. The plant was stabilized at approximately 1730 upon restoration of electrical power to non-vital busses and placement of the secondary system in a controlled configuration.

The availability of off-site power was verified within 1 hour and the Emergency Diesel Generator operability was verified within 24 hours of a loss of either off site power source as required by Technical Specification (TS) 3.8.1.1.

Normally, electrical power to the internal plant loads is supplied from either the main generator or off site via the Normal Station Service Transformers (NSSTs). Since both supply sources to the NSST were unavailable following the event, internal plant loads were automatically aligned to the Reserve Station Service Transformers (RSSTs). This alignment does not automatically supply power to the non-vital 4160 volt busses. Non-vital 4160 busses provide power to the rod control motor generator sets, and other non-vital loads. The 6.9 KV busses, supplying power to condensate and reactor coolant pumps, remained energized.

Two condensate pumps tripped on current overload as a result of the transfer from the NSSTs to the RSSTs. After an inspection, the pumps were satisfactorily started and operated.

One reactor coolant pump tripped during the transfer. The indicated cause was a locked rotor. Investigation determined that mechanical shock to a contact in the locked rotor logic caused a spurious trip of the pump. The pump was satisfactorily started and operated.

The transfer of safety related 4160 volt loads to the RSST functioned satisfactorily to maintain operation of equipment vital

to plant safety. However, the loss of non-safety related equipment impacted the recovery of the secondary plant. The loss of circulating water pumps caused a loss of condenser vacuum.

II. Cause of Event

The root cause investigation of the electrical fault protection signal reduced the possibilities to two most likely causes. They are:

- An "Out-Of-Step" tripping relay located outside the plant in the station's 345 KV switchyard could have activated the electrical fault signal. This is believed to be the most likely cause due to the fact that a target was received on this relay, However, an explanation of why this relay actuated cannot be established as it is designed to detect a slipped pole on the generator and there would be other indications which were not present.

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- An unbalanced capacitance problem may have existed on one of the phases of the generator line, possibly due to an inadequate connection between the line and its surge capacitor. An inspection of the spring finger contacts subsequent to the trip found one phase slightly out of adjustment and dirty resulting in questionable contact integrity. This was considered to be a possible cause for two reasons. First, unbalanced line capacitance has been attributed to 2 previous line trips. Second, the relay which would have provided the trip in the event of unbalanced line capacitance was found to have a faulty target. Therefore, the relay may have actuated to trip the generator and not provided any indication of having done so. This unbalanced capacitance scenario is believed to be less likely because in both previous similar trips one phase capacitor was found completely disconnected from its line by means of a blown fuse or broken spring finger contact. Additionally, both previous similar trips occurred within milliseconds, but in this event the trip occurred several hours after the line was energized.

III. Analysis of Event

This event is being reported in accordance with 10CFR50.73(a)(2)(iv) as any event or condition that resulted in automatic actuation of an ESF including the Reactor Protection System. An immediate

notification was made in accordance with 10CFR50.72(b)(2)(ii). All safety systems functioned as designed as a result of the reactor trip. A Feed Water Isolation ESF actuation occurred as expected following a trip. No other ESF signals were initiated and the event posed no significant hazard to the health and safety of the public. The loss of non-vital power for approximately 20 minutes delayed establishing normal shutdown conditions for secondary systems. An inspection was performed on equipment that could be affected by the transient; no damage was observed. Secondary plant equipment was returned to normal operation, and the unit was returned to power.

IV. Corrective Action

Concerning the suspected "Out-Of-Step" relay actuation, action was taken during subsequent plant start up to defeat the relay up to approximately 20% plant power levels. The relay protection provides electrical system stability when the unit is operating at high power output. This relay is located in the station's 345 KV switchyard. With the relay defeated, the parameters sensed by the relay were monitored in an attempt to determine if spurious signals may be experienced at the lower plant power levels. No abnormalities were found. This action will be repeated for future start ups as part of the continuing effort to determine why this relay may have actuated. The relay was verified to be correctly calibrated as part of the pre-start up review.

Concerning contacts between the line phases and their associated capacitors, a design change is being pursued to replace the spring finger arrangement with a newer design utilizing a spring mounted plate arrangement. Additionally, the faulty target on ground relay has been repaired.

Prior to restart, a visual inspection of the generator line and its connected components was performed. No external signs of damage of the 345 KV switchyard, transformers or generator were found. Additionally, oil samples of the main transformers and the NSSTs indicated that no fault occurred in any of the transformers.

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V. Additional Information

Other Licensee Event Reports (LERs) which have been submitted for reactor trips resulting from an interruption of non-vital power are as follows:

LER Number Title

91-014 Reactor Trip Due To Switchyard Relay Malfunction

88-028 Reactor Trip Due To Loss of Normal 4160 Volt Bus
Due To Procedural Deficiency

LER 91-014 discusses an event where a reactor trip and subsequent turbine trip occurred due to a phase to ground fault on a 345 Kv distribution system line external to the plant in combination with a faulty switchyard pilot wire relay. The root cause was a loose restraint tap on the switchyard pilot relay.

In response to the June 1991 trip, procedure changes were made to reduce the challenges to the secondary plant after a loss of non-vital 4160 volt power. Due to the low power at which the current trip occurred, the effectiveness of these changes could not be verified.

During the trip on June 9, 1991, power was lost to the Reactor Plant Component Cooling Water System. As a result, steam from the main condenser air ejectors caused the fire dampers in the Secondary Leak Collection and Release System (SLCRS) to close. The fusible links were upgraded from 165 degrees Fahrenheit to 285 degrees Fahrenheit. After the current loss of power event, both trains of SLCRS were verified to be operable.

LER 88-028 discusses an event where a reactor trip occurred when one of the power supplies to the Control Rod Drive Mechanism (CRDMs) was de-energized and the other failed to maintain power to the CRDMs. The root cause was procedural inadequacy for starting and paralleling the diesel to a vital 4160 volt bus when the RSST is being used to supply all 4160 volt busses. Because the root cause is different, the corrective action for this event would not have prevented the current event.

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NORTHEAST UTILITIES

NU The Connecticut Light And Power Company

Western Massachusetts Electric Company

Holyoke Water Power Company

Northeast Utilities Service Company

Northeast Nuclear Energy Company

General Offices o Selden Street, Berlin Connecticut

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December 4, 1992
MP-92-1280

Re: 10CFR50.73(a)(2)(iv)

U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555

Reference: Facility Operating License No. NPF-49
Docket No. 50-423
Licensee Event Report 92-027-00

Gentlemen:

This letter forwards Licensee Event Report 92-027-00 required to be submitted within thirty (30) days pursuant to 10CFR50.73(a)(2)(iv), any event or condition that resulted in manual or automatic actuation of any Engineered Safety Feature (ESF), including the Reactor Protection System (RPS).

Very truly yours,

NORTHEAST NUCLEAR ENERGY COMPANY

Stephen E. Scace
Vice President - Millstone Station

SES/JSY:dlr

Attachment: LER 92-027-00

cc: T. T. Martin, Region I Administrator
P. D. Swetland, Senior Resident Inspector, Millstone Unit Nos. 1, 2
and 3
V. L. Rooney, NRC Project Manager, Millstone Unit No. 3

*** END OF DOCUMENT ***
